

15-344 Combinatorics on Oct 27, hours 19-20: Term Test

Saturday, October 24, 2015 10:23 AM

Topics: Edge covers & independent sets.
Isomorphism.

$$2e = \sum \deg(x)$$

Mountain climbing.

Even cycles \Leftrightarrow bipartite

$K_{3,3}$ not planar (circle-chord)

Euler's Thm, $e \leq 3v - 6$

K_5 is not planar

Euler cycles/trail \Leftrightarrow valency.

Hamilton cycles/paths, tournaments

Q_n , Gray Codes.

map colouring.

Dual graphs, vertex colouring

Triangulations & Art galleries.

The SCT

Kemper on YCT.

Edge 3-colourings.

Chromatic polys: Examples, computation in general.

Trees.

Dijkstra's algorithm.

Solve 4 of the following 5 problems. Each problem is worth 25 points. You have an hour and fifty minutes. **Neatness counts! Language counts!**

Problem 1.

Tip. Don't start working! Read the whole exam first. You may wish to start with the questions that are easiest for you.



For each, is it bipartite? Prove in either case. Are they isomorphic?

Problem 2.

12a on page 30 (mountain climbing)

Problem 3.

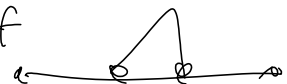
1. $K_{3,3}$ isn't planar.
2. Does it have an Euler circuit?

Problem 4.

without using the 4CT, prove that if every subgraph of a planar graph G can be 4-colored and G has a vertex of deg 4, ...

Problem 5.

compute the chromatic poly of



Good Luck!